

REMARKS

In the Office Action, Claims 1-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ode et al. (U.S. Publ. No. 2001/0007435) in view of Hongo et al. (U.S. Patent No. 6,931,239).

In response to the rejection in view of the prior art, the peak power suppressing section in the transmitter of the invention determines the ratio (instantaneous to mean power of the ratio) between the instantaneous power and the mean power of the sum of the power levels of the carriers and compares the ratio with the predetermined peak factor threshold value to detect whether there exists the peak (See page 37, lines 13-18).

As a result of the comparison, the peak power suppressing section limits power of each carrier such that the power of each carrier after the combination becomes specified power, and outputs the power-limited carrier by uniformly multiplying a multiplication factor corresponding to the sum of the power levels for each carrier (See page 38, lines 2-12).

As described in the background art, since each carrier undergoes the band limitation after the peak limitation, the peak factor of the carrier after the band limitation is larger than that before the band limitation. For this reason, an output characteristic of the power amplifier is nonlinear, which results in nonlinear distortion.

In order to suppress the maximum power of the multicarrier signal inputted to the power amplifier, the peak power suppressing section in the transmitter of the invention, detects the peak based on the instantaneous power and the mean power to the sum of the power levels of the carriers, limits the power value of each carrier when the peak is detected, and outputs the power-limited carrier. Accordingly, the peak factor of the multicarrier signal can be reduced, and thus the nonlinear distortion in the power amplifier can be prevented from being caused (See page 38, line 23 – page 39, line 6).

The monitoring section 18 calculates the parameters regarding the level adjustment of the multicarrier signal based on the mean input power outputted from each of the input power calculating sections 16-1 to 16-n and the mean output power outputted from each of the output power calculating section 17-1 to 17-n and outputs the parameters to the signal level adjusting section 15 as the level control information (See page 42, line 22 – page 43, line 3).

And the gain value $GAIN(t)$ is a parameter relating to the level adjustment of the multicarrier signal (See page 46, lines 9–11).

And if the value $GAIN(t)$ is determined, the monitoring section 18 outputs $GAIN(t)$ to the signal level adjusting section 15 as the level control information (See page 47, lines 12-14).

That is, the transmitter calculates the gain value based on the mean input/output power of the carrier and multiplies the multicarrier signal by the calculated mean input/output power. Thus, when the peak limitation to the carrier in the peak power suppressing section 11 is not sufficiently performed or when the peak limitation to the carrier is excessively performed so that the level is excessively suppressed, the transmitter can approximate the sum of the levels of the multicarrier signal corresponding to an arbitrary (frame or the like) to the sum of the levels when reference data is used. Accordingly, even when the variation in level of the input carrier occurs, the transmitter can averagely suppress the variation in level of the multicarrier signal stably (See page 50, lines 11-24).

Therefore, according to amended claim 2, a transmitter for suppressing a variation in input level of a multicarrier signal comprises a **peak suppressing section** for detecting whether there exists a peak by comparing a ratio between the instantaneous power and the mean power of the sum of power levels of inputted carriers with a predetermined peak factor threshold value and outputting the carriers the power levels of which are suppressed such that the power of each carrier after the combination becomes specified power by uniformly multiplying a multiplication factor corresponding to the sum of power levels for each carrier when the peak is detected, an **input power calculating section** for calculating a mean input power level for each carrier before the carriers are inputted to the peak

suppressing section, **an output power calculating section** for calculating a mean output power level for each carrier after the carriers are outputted from the peak suppressing section, **a monitoring section** for determining a gain value based on the mean input power level calculated by the input power calculating section and the mean output power level calculated by the output power calculating section and outputting the gain value as level control information which controls the signal level of the multicarrier signal, and **a level adjusting section** for adjusting the level of the multicarrier signal based on the level control information outputted from the monitoring section.

Accordingly, the peak factor of the multicarrier signal can be reduced, and when the peak limitation to the carrier is not sufficiently performed or when the peak limitation to the carrier is excessively performed, the transmitter can approximate the sum of the levels of the multicarrier signal corresponding to an arbitrary level to the sum of the levels when reference data is used. Thus, even when the variation in level of the input carrier occurs, the transmitter can averagely suppress the variation in level of the multicarrier signal stably.

On the other hand, Ode discloses a distortion compensation apparatus for correcting the size of a distortion compensation coefficient in such manner that a transmit signal that has undergone distortion compensation will not exceed the dynamic range of a DA converter. And Hongo discloses a peak limiter for use in a

system for amplifying a multi-carrier signal receives a baseband signal of each carrier of the multi-carrier signal.

However, Ode and Hongo do not disclose and suggest in the transmitter which comprises **the peak suppressing section** for detecting whether there exists a peak by comparing a ratio between the instantaneous power and the mean power of the sum of power levels of inputted carriers with a predetermined peak factor threshold value and outputting the carriers the power levels of which are suppressed such that the power of each carrier after the combination becomes specified power by uniformly multiplying the multiplication factor corresponding to the sum of power levels for each carrier when the peak is detected, **the input power calculating section, the output power calculating section, the monitoring section** for determining the gain value based on the mean input power level calculated by the input power calculating section and the mean output power level calculated by the output power calculating section and outputting the gain value as level control information which controls the signal level of the multicarrier signal, and **the level adjusting section**.

Especially, Ode does not disclose the above peak suppressing section and the above monitoring section.

Therefore, Ode has no effects that the peak factor of the multicarrier signal can be reduced, and when the peak limitation to the carrier is not sufficiently

performed or when the peak limitation to the carrier is excessively performed, the transmitter can approximate the sum of the levels of the multicarrier signal corresponding to an arbitrary level to the sum of the levels when reference data is used. Thus, even when the variation in level of the input carrier occurs, the transmitter can averagely suppress the variation in level of the multicarrier signal stably.

Also the transmitters in claims 2-5 have similar technical features of the transmitter in claim 1, and have the almost same effects of the transmitter in claim 1.

The transmitter of the present invention has special technical features different from Ode and Hongo, and also has special effects which Ode and Hongo do not have.

Accordingly, it is believed that claims 2-5 are allowable.


Based on the foregoing amendments and remarks, it is respectfully submitted that the claims in the present application, as they now stand, patentably distinguish over the references cited and applied by the Examiner. A Notice of Allowance is in order, and such favorable action and reconsideration are respectfully requested.

However, if after reviewing the above amendments and remarks, the Examiner has any questions or comments, he is cordially invited to contact the undersigned attorneys.

Respectfully submitted,

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